

AD-A080 717

UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES  
THE NOTION OF STRUCTURAL BALANCE AND THE INTERNATIONAL SYSTEM. (U)

F/8 5/4

JAN 78 R O SHERWIN

N00014-67-A-0269-0004

ML

UNCLASSIFIED

1 1/2  
1/2



END  
DATE  
FILMED  
3-80  
DRI

DDC FILE COPY  
ADA 080717

**LEVEL**

①

ONR-  
USC&I  
S. 12

⑥ THE NOTION OF STRUCTURAL BALANCE  
AND THE INTERNATIONAL SYSTEM.

⑩ by  
Ronald G. Sherwin

DDC  
FEB 14 1980  
REGISTRY  
E

⑨ World Event/Interaction Survey,  
Support Study no. 6,

Produced in support of Office of Naval Research  
Contract #N00014-67-A-0269-0004 ✓

⑪ ⑮  
University of Southern California ✓  
Jan 1972

⑫ 37

This document has been approved  
for public release and sale; its  
distribution is unlimited.

79 10 26 256

/ - 36 L 256

477

ERRATA

1. Page 2, paragraph 2, line 2 should read, "In another paper a Middle East example was presented that focused on a network of relations." The other paper being referred to is "Introduction to the Graph Theory and Structural Balance Approaches to International Relations," W.E.I.S. Support Study #6, November, 1971.
2. Page 3, paragraph 1, line 3 should read, ". thus attaining balance with all three countries in the triad having friendly relations..."
3. Page 10, paragraph 1, line 3 should read, "This possibility has been examined in another paper...." See #1 above.
4. Page 26, paragraph 2, line 16 should read, "...if greater intro-sub-system imbalance would result from changing a particular inter-subsystem structure, then the tendency..."
5. Page 28, paragraph 1, line 15 should read, "...highly negative relation is less likely to change..."

Accession For	
NEIS	GF&I
DGC	TAB
Unannounced	Justification
<i>for on file</i>	
By	
Distribution/	
Availability Codes	
At	Avail and/or special
<i>A</i>	

One of the notions that receives periodic attention in the field of international relations is the notion of structural balance. It appeals to international relations scholars because it is simple, neat, and it can be used to organize and explain a great deal of information about the relations among nations. In addition, the notion of structural balance can be expanded to include other notions about international relations.

In this paper a generalized theory of structural balance is developed for application in the study of international relations. As the discussion develops, some theoretical leads which enrich the basic notion are drawn from the literature of international relations. The end product is a set of ideas from which researchable hypotheses may be derived for subsequent operationalization.

#### The Notion of Structural Balance

Given a set of relations among a group of interacting social entities, the structural balance notion says that there is a tendency for those relations to achieve overall balance, and that this tendency increases as the degree of imbalance in the group's network of relations increases. Where the individual members of a group are concerned, balance theory suggests that each group member will attempt to balance its relations with other group members, and that this tendency increases as the degree of imbalance in its set of relations increases. Fritz Heider, one of the originators of the structural balance concept, expressed the principle in this fashion:

In the case of two entities, a balanced state exists if the relation between them is positive (or negative) in all respects....In the case of three entities, a balanced state exists if all three relations are positive in all

respects, or if two are negative and one is positive.

If no balanced state exists, then forces towards this state will arise. Either the dynamic characters will change, or the relations will be changed through action or through cognitive reorganization. If change is not possible, the state of imbalance will produce tension.<sup>1</sup>

Heider's formulation was expanded and substantiated in a study by Julian Morrissette where,

...Heider's...hypotheses are restated as follows: (a) The magnitude of forces towards balance is inversely related to the degree of balance of the system; (b) the magnitude of tension created by a system is inversely related to the degree of balance of the system.<sup>2</sup>

Many familiar international relations situations provide an example of the structural balance principle. In the preceding paper a Middle East example was presented that focused on a network of relations. A similar example that focuses on the relations of one nation is presented here. During the late 1950's and early 1960's Egypt's late President Gamal Abdel Nasser used the phrase "positive neutralism" to describe a foreign policy which attempted to steer a course between two poles in a "Cold War." A diagram depicting the structural relations among the United States, Russia, and the United Arab Republic during this period shows how difficult it must have been for President Nasser to maintain his course. With two positive sets of relations, and one negative set, the Russia-United States-Egypt triad was unbalanced, and according to the structural balance concept, contained forces impelling it towards balance (See Figure 1). Nasser was trying to withstand these balance-seeking pressures and preserve the unbalanced state in an effort to maximize Egypt's gains from burning the candle at both ends. Meanwhile, Russia and the United States were each trying to gain allies in their Cold War

with one another. The situation could have become balanced in one of two ways: (1) Russia and the United States could have ceased their Cold War competition, thus attaining all three countries in the triad to have friendly relations with one another; or (2) The relations between Egypt and either Russia or the United States could have soured to the point where Egypt was a friend of one of the Cold War powers and an enemy of the other. Events seem to show that the Russia-United States-Egypt triad achieved balance through the second means when United States-Egyptian relations soured, and, despite certain ideological, political, and cultural aversions the United Arab Republic is supposed to have with regard to Russia, Egyptian-Russian relations strengthened. No doubt, the balanced set of relations that emerged among Russia, the United States, and Egypt did not occur by chance, and, as will be shown, some of the variables affecting the direction in which a specific triadic structure will move can be derived from the overall structure of the international system in which that triadic structure exists.

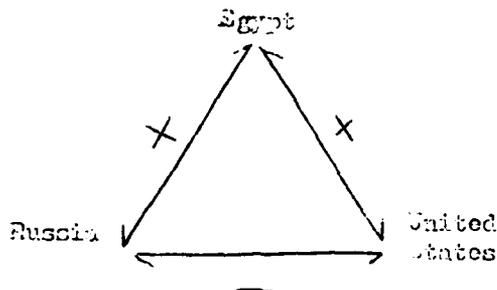


Figure 1. Egypt's "Positive Neutralism"

As the illustrative examples in the preceding and present papers were presented, no clear distinction was made as to whether the focus was on single nations or on groups of nations. It needs to be said that

the notion of structural balance can be operationalized from either a single nation perspective or from a systemic perspective. Since the structure of international relations is a product of the behavior of individual nations, and since any triadic structure is composed of three individual nations, an analyst can choose to operate from a single nation perspective that focuses on the role of one nation in one or more triads. Thus, in the preceding example if the behavior of Egypt was of central concern a research question might emerge about Egyptian responses to shifts in the valence of United States-Russian relations. Or, by focusing on another actor in the triad, one might ask if the United States could have effectively established friendly relations with both Egypt and Russia in a "Cold War" context.

The analyst might shift his analysis from a concern for individual nations in balanced or unbalanced triads to a concern for the entire set of relations in one or several triads. In a Russia-United States-Egypt triad an analyst might formulate research questions concerning the configuration of relations in that triad. One such question might be in which direction is the entire set of relations moving? Is it moving towards a balanced state with all friendly relations, or is it moving towards a balanced state with two negative relations and one friendly relation? In a broader context an analyst might study the overall balance of a set of triads among a large group of nations where general stability throughout the system is a major concern.

Whether an analyst chooses to operationalize the structural balance notion by focusing on the structural pressures that impinge upon single nations, or whether he chooses to focus on larger systemic structures

seems to be tempered by personal preference, hunches, conceptualization, and available data. At this point the decision to operate in one mode or the other seems purely arbitrary, and theoretically speaking, whether an analyst approaches structural balance from a single nation perspective or from a systemic perspective seems unimportant. What does seem important, however, is that from which ever mode the notion of structural balance is operationalized, the analyst should be clear in his own mind that he has chosen one mode or the other, and he should be careful to avoid confounding his analysis by inadvertently slipping from one mode to the other.<sup>3</sup> If this point is not clear, it should become clear later in the discussion when statements are made concerning the tendency of individual nations to maintain balance in their relations vis a vis the tendency of entire systems to achieve balance.

#### Generalizing the Notion

Now it is time to examine the tendencies to achieve balance in a generalized, three-nation system whose relations are depicted on a "digraph,"  $D_1$ , where each nation is represented by a point,  $v_1$ ,  $v_2$ , or  $v_3$ , where directed lines indicate relations between nations, and where the sentiments of interaction have been given a plus or minus sign according to whether the relations are seen as "positive" or "negative".<sup>4</sup> In this context positive relations are thought of as those relations which are usually referred to as "friendly," "cooperative," or "good," while negative relations are thought of as those relations which are usually referred to as "unfriendly," "hostile," "uncooperative," or "bad."

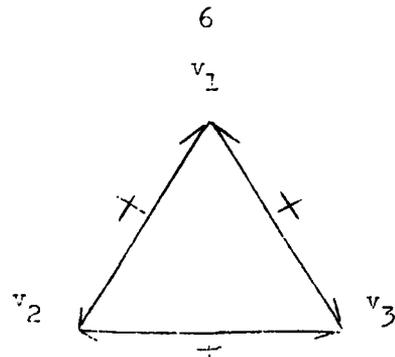


Figure 2. Balanced Triad,  $D_2$

In  $D_1$ , the situation is balanced because all of the relations are positive, and presumably, each of the points is "comfortable" in this situation. Balance theory suggests there is no tendency towards changing relations in this balanced situation.

In  $D_2$  the situation, while different from the situation in  $D_1$ , is still balanced.

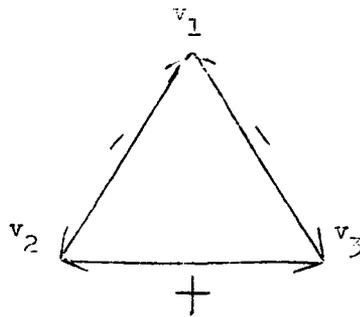


Figure 3. Balanced Triad,  $D_2$

In  $D_2$  points  $v_2$  and  $v_3$  have positive relations with each other, while each has negative relations with  $v_1$ . Balance theory suggests, again, that there is no tendency for the relations in  $D_2$  to change. However, one wonders to what extent  $v_1$  "enjoys" being "ganged-up" on by  $v_2$  and  $v_3$  and whether or not  $v_1$  might try and make an ally of  $v_2$  or  $v_3$  against the remaining nation. One also wonders whether  $v_1$  might feel compelled to get on better terms with  $v_2$  and  $v_3$ , and to what extent the "strength" of

the original bonds affects the alternatives open to  $v_1$  should it try to change the situation.<sup>5</sup> According to the structural balance concept, the situation in  $D_2$  is balanced, but perhaps it is not as stable as the situation in  $D_1$ .

Unlike  $D_1$  and  $D_2$ , the situation in  $D_3$  is unbalanced.

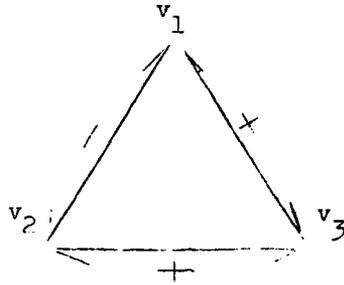


Figure 4. Unbalanced Triad,  $D_3$

In  $D_3$  balance theory suggests there is a tendency for all of the relations to become positive, or for one of the positive relations to become negative. From the perspective of one of the points in  $D_3$ , say  $v_2$ , the situation is unbalanced in the sense that  $v_2$  is "friends" with  $v_3$  and "enemies" with  $v_1$ , and  $v_2$  has a difficult time reconciling the fact that its friend has a positive relation with its enemy. Point  $v_2$  might be expected to achieve balance in its relations by turning the  $v_2v_3$  relation negative by directing "hostile" behavior to both  $v_1$  and  $v_3$ , or  $v_2$  might turn the  $v_2v_1$  relation positive by directing "friendly" behavior to both  $v_1$  and  $v_3$ . Point  $v_1$  is in a position similar to that of  $v_2$ , while  $v_3$  has a difficult time trying to stand between the two "enemies."

One other case of positive and negative relations between points in a triad can occur. In  $D_4$  the relations are all negative. This is

considered an unbalanced situation. According to balance theory,  $D_4$  should display a tendency to achieve balance, possibly, through two of its points "allying" themselves against the third,<sup>6</sup> or through friendly relations being established among all three members of the triad.

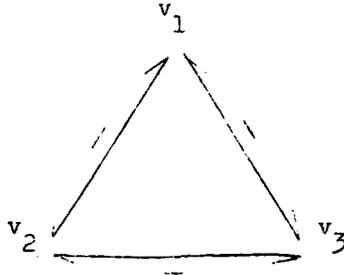


Figure 5. Unbalanced Triad,  $D_4$

The above digraphs,  $D_1, \dots, D_4$ , provide insight as to the general nature of the structural balance principle, not only in terms of the overall structural tendencies in a balanced or unbalanced triadic situation, but also in terms of the "pressures" upon each point in that situation. In a loose sense the digraphs,  $D_1, \dots, D_4$  comprise a taxonomy of the various balanced and unbalanced structures that can emerge in a triadic situation. If one were interested in developing the taxonomy to its fullest, he might first concern himself with the ramifications of rotating each triadic structure  $120^\circ$  within any given set of three points. Obviously, this would have little effect on the structural properties and presumed tendencies in  $D_1$  and  $D_4$  where all of the relations are the same, but in  $D_2$  and  $D_3$  four new structural possibilities for relating each of the three points to one another will have been revealed. The second step in developing the taxonomy would involve splitting bilateral relations into their unilateral components. This would open possibilities for

dealing with situations where one nation's positive relation towards a second nation is met by a negative relation. The next taxonomic breakdown might consider the situational cases wherein no relations exist between two nations, that is, in "unclosed" triads, or where a relation from one nation towards another evokes no "response" from the other nation.

#### Expanding the Notion

For the moment fully developed triadic taxonomies are not the central concern, but some other complicating taxonomic dimensions should be mentioned that become apparent when one recognizes the large number of triadic situations that can exist among a number of nations when  $N \geq 3$ . Suppose there were four points in a digraph,  $D_5$ , each related to the next. This opens the possibility for there being four triadic, relational structures among the four points as the following digraph illustrates.

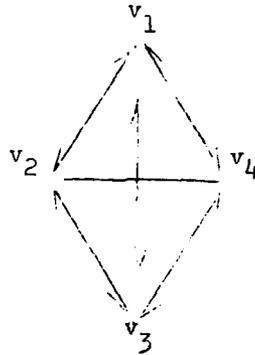


Figure 6.  $N \geq 3$  in  $D_5$

In this digraph the four triadic relational structures are comprised of the triads  $v_1, v_2, \text{ and } v_3$ ;  $v_2, v_1, \text{ and } v_4$ ;  $v_4, v_2, \text{ and } v_3$ ; as well as  $v_3, v_4, \text{ and } v_1$  together with their relations. Triadic structures having

bilateral relations are stressed here. Were unilateral relations stressed, the number of possible triadic structures would be compounded still further. This possibility will be examined in the next chapter, but, for now, remembering the minimal number of taxonomic types as illustrated in  $D_1$ , ...,  $D_4$ , and remembering that each of the triads in  $D_5$  can assume each of those balanced or unbalanced configurations, it is apparent that there is a very large number of possible configurations for the group's overall triadic structures in  $D_5$ .

Another complicating dimension is revealed upon realizing that the relations among any group of nations can be dependent upon the relations that one member of that group has with some other nations with whom no other members of the original group have relations. This condition is illustrated by the following digraph,  $D_6$ .

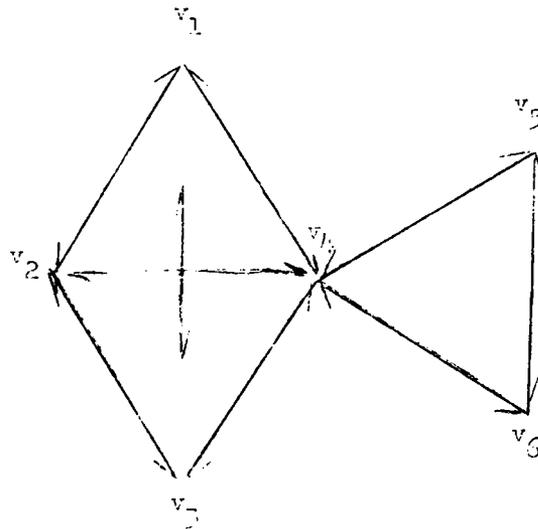


Figure 7.

In this example the structural balance concept leads to the conclusion that the degree of balance in the triadic relations among points  $v_1$ ,  $v_2$ ,  $v_3$ , and  $v_4$  are to some extent dependent upon the triadic relations among points  $v_4$ ,  $v_5$ , and  $v_6$ . This is because of a presumed tendency for  $v_4$  to keep the ratio of balanced to unbalanced triadic structures of which it is a member within tolerable limits.<sup>7</sup> That is, as the number of unbalanced triadic structures of which  $v_4$  is a member increases, the greater will be  $v_4$ 's tendency to behave in a fashion designed to bring about balanced relations in some or all of those triads.

Thus far the question of what would cause balance, or equilibrium, disturbing shifts to occur in an either stable or unstable balanced set of relations has been avoided. In terms of the discussion so far, part of the answer to this question lies in the condition of, and the direction of change in other relevant sets of relations; that is, the state of the international system elsewhere. Another part of the answer lies in those internal conditions of the system's actors which may shift, and, thereby, affect an actor's external behavior. Such internal factors that readily come to mind as possible determinants of external behavior include regime changes, ideologies, national goals, and the way these factors are linked with the external environment. Perhaps an even more important factor affecting a nation's external behavior in balanced and unbalanced triads is the phenomenological factor, or the way a nation's decision-makers perceive the structure of their nation's environment. Thus, a complete answer to the question of why relations between actors shift will probably include a mixing of what are usually thought of as internal, linking, and external causes of international behavior. The structural

balance principle, while acknowledging the existence of internal forces, focuses on the external behavioral forces that impinge upon nations. Employing the structural balance principle for analyzing international relations, then, is an effort to see if the relations that nations maintain among themselves affect future relations among those, as well as other, nations, and to what extent data about international behavior fits the principles suggested by the structural balance concept.

Another complicating element needs to be introduced into the structural analysis of international relations. In the Middle East situation the structure among nations was conceived as being derived from interaction over a single issue, the Arab-Israeli conflict. It has been suggested that international actors interact with each other over many issues.<sup>8</sup> If that is so, it is easy to see how the structure of interaction over one issue can affect the structure of interaction over another issue. For instance, the Sino-Soviet split, the Indo-Pakistani dispute, and relations between India and China can be seen as having an effect on Russian-Arab relations, particularly Russian-Egyptian relations. By plugging the three new "issues", or interaction nets, into a Middle East digraph, a digraph is obtained which contains three new points, one each for China ("CHN"), India ("IND"), and Pakistan ("PAK"). From the structure of this digraph, it can be seen that Egypt is in three new triadic situations, all of which are unbalanced (See Figure 8). This leads to the conclusion that, other conditions remaining equal, there is a great deal of pressure upon Egypt to balance the triads of which it is a member. However, the extent to which Egypt will display the balance-seeking tendency is probably dependent upon the "saliency" of these

other issues to Egypt, as well as the other variables that were seen as conditioning the propensity of relations to shift. One of the problems in operationalizing the structural balance concept for analyzing a body of data may revolve around this problem of determining, say, at what point relations between Britain and Malta account for such a small amount of the variation in the relations between the United States and Barbados as to be, for practical purposes, insignificant. This problem will be taken up again.

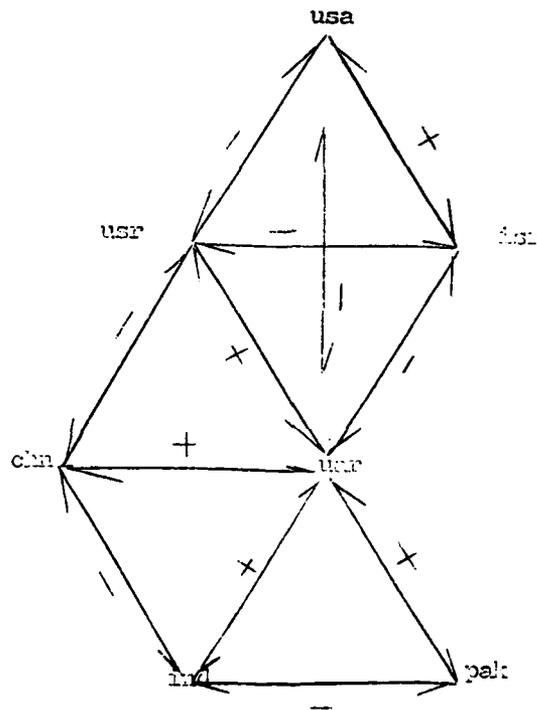


Figure 8. Middle East; Multiple Issues

So far, the structural balance concept has been reviewed, and how it might be used to analyze relations among nations has been discussed. Several complicating notions have been introduced which must be worked

out before structural balance techniques can be used in systematic analyses of international relations. No doubt, these problems can be resolved.

In the remainder of this paper various discussions will be included with an eye towards shedding more light on the structural balance concept and its possible application to international relations. The following section will explore hypotheses and extend the structural balance concept more fully into the study of international relations.

#### Further Extensions of the Concept

The structural balance concept maintains that there is a tendency among interacting units to maintain or achieve balance in their relations along positive and negative dimensions. Taken as a whole, an entire group of nations is expected to achieve balance in its set of relations. This is true because of each nation's presumed tendency to achieve balance in its relations. The structural balance concept further maintains that nations' tendency to achieve balance is a function of the degree of balance in their set of relations so that the lower the degree of balance, the greater the tendency for the group to achieve balance. Similarly, each nation's tendency to achieve balance is a function of the "degree of balance" in its set of relations so that the lower the degree of balance at its location in a behavioral structure, the greater the nation's tendency to achieve balance.

In Heider's original statement of the structural balance concept, the term "tension" was used to describe the effect continual imbalance had upon a system's actors. Presumably the degree of tension and the

desire to relieve tension are correlated with the degree of balance in such a way that the lower the degree of balance in any nation's relations, the greater the "tension" upon that nation, and the greater that nation's "desire" to seek balance in its relations. Whether a nation needs total balance or partial imbalance to function smoothly is a question for research, but it seems reasonable to assume that in the presence of a low degree of balance single nations are motivated to reduce the tension created by their surrounding unbalanced relations.<sup>9</sup> This concept becomes important in partially explaining why certain triadic sets of relations are preferred over others and why the international system is expected to manifest a higher number of balanced triadic structures than unbalanced triadic structures.

The above concepts and propositions can be combined in varying ways to reveal several worthwhile hypotheses about the way an international system works. These hypotheses seem easily testable once interaction data has been transformed into reliable positive and negative dimensions for depicting the valence of relations among nations. For purely descriptive, and simple predictive studies these hypotheses, if confirmed, might be used to describe the state of the international system generally and the direction in which it is moving, or they might be used to describe the state of relations of individual nations and the direction in which they are moving. Briefly listing some general, related hypotheses where time is a variable includes: (1) Balanced triadic structures occur in the international system, or in any of its subsystems, in a statistically significant higher number than unbalanced triadic structures. (2) In international subsystems where balance is low,

balance will be high at a subsequent time period. (3) At locations in the international system where the balance of the relations of a single nation is low, the balance of that nation's relations will be high at a subsequent time period. (4) And balanced relations will emerge soonest where balance is lowest.

While they are useful, statements like these are also problematical in that they lack specificity. However, some new concepts may be introduced which help overcome this problem and add further meaning to the notion of structural balance as it applies to international relations.

The structural balance concept says there is a tendency for unbalanced situations to seek balance. In the four triadic valence structures there were two balanced types: one type having all positive relations and the other type having two negative relations and one positive relation. These types are reviewed below.

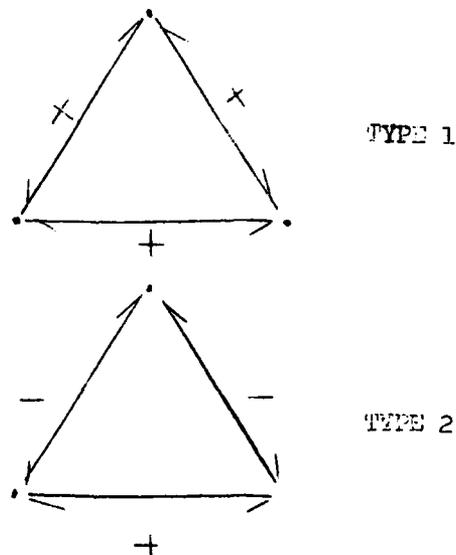


Figure 9. Balanced Triads, Types 1 & 2

Likewise, there appear to be two general types of unbalanced triadic valence structures.

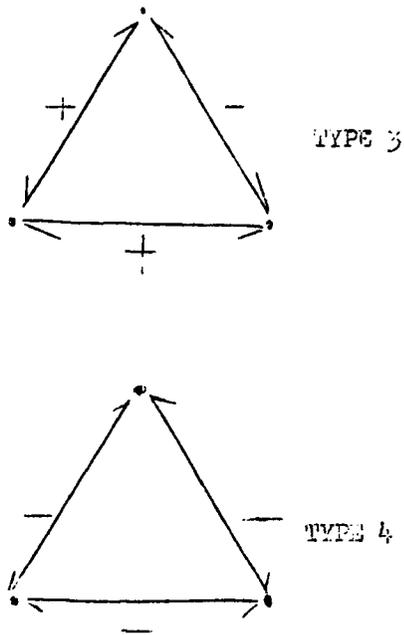


Figure 10. Balanced Triads, Types 3 & 4

Assuming it takes the same amount of "energy" to change the valence of any relation in any triadic structure, the above Types 1, 2, 3, and 4 have been placed on a digraph (Figure 11) where the lines between the types indicate the "case" with which one type can become one of the other types through changing the valence of one of the lines in a triad.

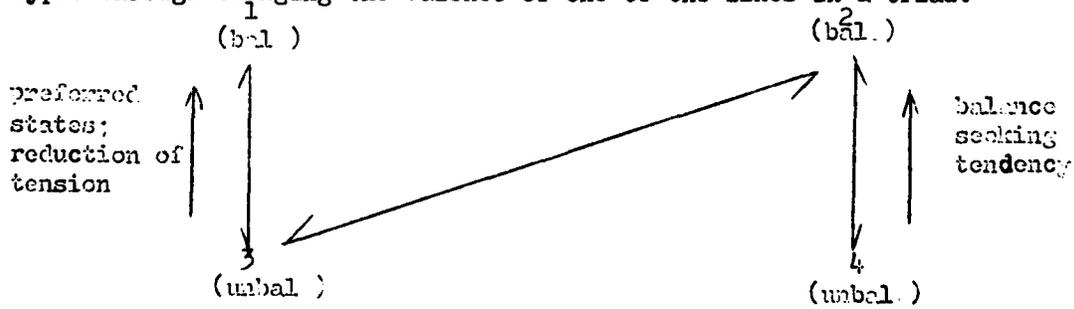


Figure 11. Balanced and Unbalanced Triads

Juxtaposing the valence types in this fashion lends insight into the tendency of one triadic valence structure to become another triadic valence structure. The following statements combine the principle that unbalanced triadic structures tend to achieve balance with the ideas of stability and preferred states inherent in Figure 11.

- A. A Type 1 triad is more stably balanced than a Type 2 triad because (1) of the fewer opportunities for it to become unbalanced, and because (2) of the general tendency for triadic structures to maintain balance and reduce tension; and...
- B. ...for these reasons A(1) and A(2) a Type 2 triad is more likely to give way than a Type 1 triad if equal overall systemic balance can be achieved in the next time period.
- C. Given a propensity for a Type 2 triad to change, and provided greater overall balance cannot be achieved by choosing a Type 3 triad over a Type 4 triad, or vice versa, there is equal probability for a Type 2 triad to become a Type 3 or a Type 4 triad in the next time period...
- D. ...however, there is no probability for a Type 4 triad to become a Type 2 or a Type 1 triad in the next time period...
- E. ...while there is equal probability for a Type 3 triad to become a Type 1 or a Type 2 triad.
- F. There is no probability for a Type 1 triad to become a Type 2 triad, a Type 2 triad to become a Type 1 triad, a Type 3 triad to become a Type 4 triad, a Type 4 triad to become a Type 3 triad, a Type 1 triad to become a Type 4 triad, or for a Type 4 triad to

become a Type 1 triad in the next time period.

The term "next time period" in the above statements is actually a variable, for some time periods are short while others are long, depending on the speed of a process. That is, time periods in international relations may not be as significantly related to the rotation of the earth on its axis as they are to the processes they are being used to measure. Furthermore, similar international relations processes may take varying amounts of time. Even so, it is difficult to imagine any Type 4 triads becoming a Type 1 triad without first passing through recognizable Type 3 and Type 2 states.

In further reference to international relations time periods, it would seem that they have beginnings and endings. There is some point in time at which, say, an escalation process begins, ends, or even accelerates or changes direction. These shifts in the course of the unfolding of international events are usually associated with specific calendar dates and specific events. The dates and specific events mark the beginnings and endings of more subtle international relations processes. They appear as peaks, valleys, and dogs' legs on trend lines.

The overt shooting between the Arabs and the Israelis began on June 6, 1967 not because it was June 6, but because the unfolding of international events had gone through such a process and had reached such a state by that time that the date, June 6, marks a watershed point in Arab-Israeli relations. Similarly, December 7, 1941 marked a definite turning point in United States-Japanese relations. Not that events associated with June 6 and December 7 marked such dramatic turning points in international relations that their occurrence or effects were totally un-

expected; indeed, those events may be viewed as small events in a long chain of many events which may or may not mark gradual, incremental changes in the patterns of international relations. No doubt, the trends leading to the pattern of Arab-Israeli relations after the outbreak of the June War were contained in the previous time period. June 6 may be looked upon as the date on which the pressures and processes that had been building up in the preceding time period took a turn marking the end of one phase in Arab-Israeli relations and the beginning of another.

The above statements, A through F, were offered in reference to triads where all nations were connected by valenced relations. One thing that seems to apply to triadic international relations structures is that interaction may not occur over all three channels in a triad during any particular time period. That is to say that for some time periods it is possible that the triadic structures for some groups of three nations are dormant, or non-existent, since no interaction may be seen to pass among any of the three nations when it might otherwise be expected to do so. Likewise, it is possible that for some time periods interaction among the members of a triad may occur in such a fashion that only one or two sides of a triadic structure may be said to exist in which case the triad would be incomplete.

On the basis of existing structural relations alone, it would seem difficult to predict the manner in which an incomplete triad would become complete in a succeeding time period if there were no valenced relations or only one valenced relation established among the members of potentially complete triads. Although the structural balance notion says such triads would eventually assume a balanced configuration, little

can be told about which configuration will emerge in incomplete triads where only one or no relations exist. One way of increasing the predictability of emerging triadic valence structures would be to examine those internal factors that affect a nation's foreign policy which were alluded to earlier, namely, institutional variables, ideological variables, national goals, and phenomenological variables. However, the structural balance principle holds these factors constant as it attempts to explain and predict nations' behavior on the basis of existing structural relations, so that for the present at least, including internal factors in a structural analysis violates the structural-level-only rule. This issue will be returned to when the notion of tension caused by structural imbalance is discussed in terms of whether or not it adequately explains nations' motivation to behave in the international system.

While it would not seem that much insight about emerging triadic valence structures can be gained on the basis of knowledge about one or no relations, predicting the third relation in a potential triad when two of its relations are known seems more promising. If the propensity for triadic structures to be balanced holds, one can predict in potentially complete triads when two relations have a positive valence that if a third relation should emerge it also will be positive. One can also predict the emergence of a positive relation if two relations with negative valences are already known to exist in a triad. In a similar fashion, when a positive and a negative relation are observed, the predicted relation will be negative. Figure 12 describes for potential triads how they might become complete triads when the valence of two existing relations are known.

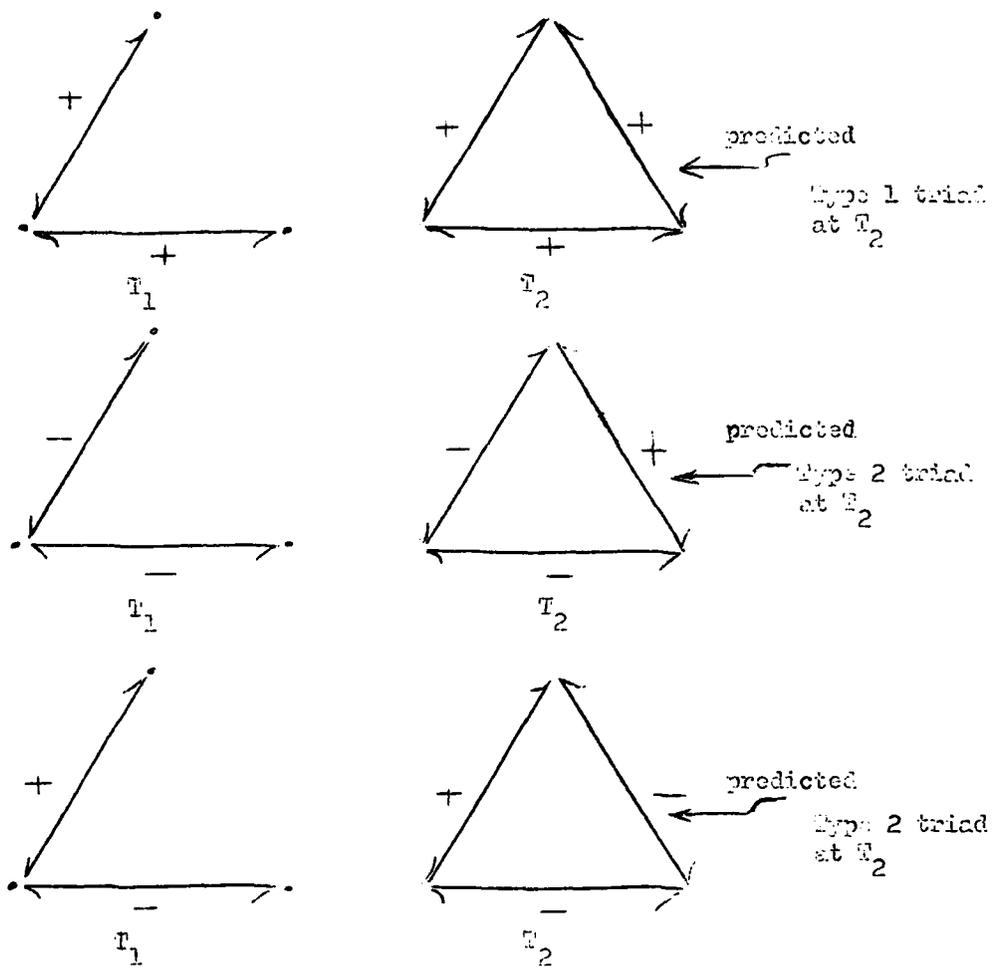


Figure 12. Complete Triads When Two Sides Are Known

Why unbalanced or incomplete triadic structures would gravitate towards Type 1 or Type 2 unbalanced states might be further explained by calling upon the concept of "tension." Assuming points in triadic structures strive for balance in their relations, that is, assuming they attempt to relieve structural tension, it might be that a Type 4

structure is a highly tension-charged, Hobbesian world where each point dislikes each other point, and where the inclination will be for two of the points to form a bond against the third by creating a Type 2 triad. Once created, a Type 2 triad will tend to persist because of its inherent balance forces. Likewise, a Type 3 set of triadic relations might contain a degree of tension which the actors maintaining it will seek to relieve by forming a Type 1 or a Type 2 set of bonds.

It would seem that balanced groups with all positive relations are preferred by international actors to balanced groups with hostile relations. For this reason, a Type 1 situation would be preferred to a Type 2 situation by a set of nations, but their ability to achieve this state in their relations would be dependent upon their ability to overcome the structural forces that are a product of their interaction.

Taking all the triadic relations in the international system, it is easy to see how Type 1 and 2 triads seem more abundant than Type 3 and 4 triads. Further, the quantity of Type 1 triadic structures in the international system seems to exceed the quantity of Type 2 structures. Finally, those Type 3 or Type 4 structures that do occur seem either to move quickly to Type 1 or Type 2 structures, or to break down and disappear. The disappearance of unbalanced triads would be due to the tension concept. The fact such triads failed to become balanced may be accounted for by either contiguous structural forces or by internal factors. Figure 13 shows the propensity of triadic structures to move to and stay in any of the four valenced types of triads.<sup>10</sup> Of course, any real tendency for triadic relations to conform to this pattern will have to be empirically verified.

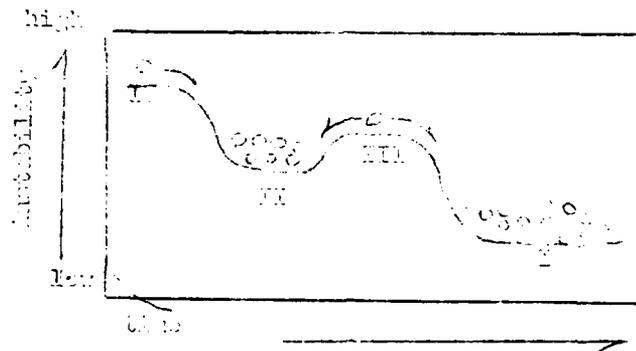


Figure 13: Tendency of Balanced Triads To Be More Numerous

With the four triadic types, a new dimension may have been added to the structural balance principle as it applies to international relations; however, the extent to which this dimension might be demonstrated is, as was said, related to "other 'intervening variables.'"

It is apparent from every day experience that not all international relations triads are balanced. Why do unbalanced triads exist in the international system? The answer seems to lie, at least partially, in the proposition that the international system's overall tendency is towards balance. This leads to the statement that, if greater overall systemic imbalance were created by the balancing of a particular unbalanced triadic structure, then the tendency will be for that triadic structure to remain unbalanced. In this sense, it can be seen how there actually could be systemic "forces" working on a triad holding it in a state of unbalanced equilibrium. Balance producing shifts in such triads would require commensurate shifts among other triads throughout the system.

It is not uncommon to think of the international system as comprised

of subsystems.<sup>11</sup> By introducing subsystems and issue-area subsystem concepts into the structural balance notion, still more specificity may be added to statements about how the international system works in terms of its presumed tendency to seek structural balance. Although there is disagreement as to what the criteria and boundaries of international subsystems should be, there is general agreement that the international system is composed of a European subsystem, a Latin American subsystem, a Middle East subsystem, and African subsystem, and so on. Using the criterion of interaction, an international subsystem might be defined in terms of the quantity of interaction among its actors in an absolute or relative sense. "Absolute" would refer to specified quantities of event-interactions which have been empirically demonstrated as definitional limits or thresholds, while "relative" would refer to percentages or proportions of on-going processes. A subsystem interaction criterion would define areas of highly concentrated, or dense, interaction networks as international subsystems, and the areas where interaction networks trailed off, or thinned out, would be defined as subsystem boundaries. In a topographical sense, international subsystems would appear as peaks, and international subsystem boundaries would appear as valleys. In practical terms it can be easily seen how there is likely to be more interaction among African countries and more interaction among Latin American countries than interaction between these groups of countries for almost any given time period.<sup>12</sup>

The relationship of this subsystem concept to the structural balance concept leads to an explanation as to why certain unbalanced triadic

structures might be "tolerated" in the entire network of international relations. An hypothesis worth testing stems from the statement that intra-subsystem structures are more "salient" than inter-subsystem structures, so that, if greater intra-subsystem imbalance were created by balancing a particular inter-subsystem structure, then the tendency will be for that inter-subsystem structure to remain unbalanced. This leads to another criterion by which subsystems may be defined, that is, as clusters of balanced triadic structures.<sup>13</sup>

Another way of approaching the problem of accounting for the persistence of unbalanced structures in the entire international system is through the issue-area concept.<sup>14</sup> Here the question is who interacts with whom about what issue, and what is the quality of their relationship concerning that issue? Again, "saliency" seems relevant and would be measured by the quantity of interaction over a specific issue, so that, for any one issue, peaks would indicate the domains of international subsystems and valleys their boundaries. Realizing that nations do not do things to one another over single issues, but, rather over a multitude of issues, leads to the statement that international subsystems are areas where balance is maintained among international actors in terms of most of the issues over which they interact, but especially in terms of the issues over which there is the most interaction. In trying to account for the existence of unbalanced issue-area structures, one is inclined to say that, collectively, intra-subsystem structures are more salient than inter-subsystem structures, so that, if greater inter-subsystem structure, then the tendency will be for that inter-subsystem structure to remain unbalanced.

The reasonable expectation concerning the balance of issue-area related behavior within subsystems, is that those issues which are the most salient are the ones which are most likely to reflect balanced behavior. This idea would explain why three countries may find themselves in an unbalanced triad concerning some minor issue. So long as their interaction concerning the major issue among them is balanced, then the likelihood that their set of relations can withstand minor strains will be increased.

Now the question becomes what is the relation between saliency defined in terms of issues and saliency defined in terms of interaction quantities? The suspicion is that the two types of saliency in an interaction structure are positively related; that is, the more interaction over a certain issue, the more salient the issue, and the more salient the issue, the greater the likelihood that interaction concerning it will be balanced. This leads to the conclusion that those channels over which flow the most interaction are the most salient, and, consequently, are the most likely to be balanced.

The same type of reasoning may be applied to individual nations where they would be expected to achieve balance in their most salient relations. In achieving balance, nations might change the valence of existing relations, or, where this is not possible because of structural resistance to change, they might sever old, unbalanced relations and establish new, balanced relations in an effort to raise the degree of balance at their location in the system.<sup>15</sup>

So far, only the general nature of an international system to achieve balance in its triadic valence structures has been discussed.

Making statements about which relations will change, which relations will be severed, or which new ones might form in a balance seeking structure is difficult without possessing some empirical data on the way structures seek balance. Nevertheless, some illuminating concepts can be offered. The first of these might be the "strength" of a relations, where the stronger a relation, the less likely that relation will be to succumb to a system's balance seeking forces. In this case, "strength" can be conceived of as positively related to the saliency of a relationship in either the entire system or in the individual actor's net whose behavior produced it. At the same time, the "strength" of a relation may be related to the extent to which a positive or negative interaction dimension characterizes it, that is, the degree to which the relations is wholly and absolutely positive, or wholly and absolutely negative. One might be inclined to say, then, that a highly salient, highly negative relation is likely to change its valence than a less salient, less negative relation where equal systemic pressures towards balance exist.

A second concept governing future balanced states in the international system might be that balance will be sought along the path of least resistance.<sup>16</sup> Little insight is provided here, except that a system, or a single actor in the system, would be expected to achieve balance through altering or establishing a minimal set of relations. This notion is consistent with the predictive capability described above when the valence of two relations in a potential triad are known. Whatever the concepts happen to be which eventually

allow statements about emerging balanced conditions to be made, they will most certainly take into account that it is easier to conceive of relations, say, between the United States and Turkey turning sour before United States-Mexico relations, and of relations between the United States and Mexico turning sour before United States-Canada relations.

#### Structural Balance and Why Nations Interact

One of the basic contentions in this paper has been that the pattern of international relations generally will conform to the structural balance principle and that individual nations will modify their behavior to conform to that principle. Two of the reasons given for these tendencies are that "tension" is produced by structural imbalance and that along with tension there arises a need to relieve that tension. From the "need to reduce 'tension'" as an explanation for the presence of balanced configurations in international relations, it is an easy step to argue that maintaining balance is a motivating factor in international relations that is itself a sufficient explanation for why nations become involved with each other. Unfortunately, it is no more appropriate to assume that nations have a special need to establish and maintain balanced relations than it is appropriate to assume such a thing as nations have a special need to acquire power and maximize its gains while minimizing its losses.

Probably nobody can satisfactorily explain why nations establish relations among themselves. What is being maintained here is that, for whatever reasons, nations in fact do establish relations with one another and when those relations are established they will assume a pattern consistent with the notion of structural balance. So far as any need to reduce tension in unbalanced structures exists, it is only an assumption

which leads to some researchable hypotheses about international relations structures without delving into the internal variables that affect nations' behavior, and this, it will be recalled, is the only requirement that is made of an assumption when it is not itself an hypothesis.<sup>17</sup>

#### Structural Balance During Crises

As the discussion in this paper has proceeded, several variables have been introduced which seem to be related to the propensity of international relations structures to assume a balanced configuration. Allowing for these variables in a systematic research effort may prove difficult, especially when no systematic, replicable operationalizations of the structural balance concept exist in the international relations literature. Without any clearly successful examples of how the structural balance concept may be operationalized one has to turn to intuition and improvisation as additional ingredients in choosing the best way to systematically approach structural balance. The hunch that seems best to follow concerns the structure of interaction during crises. More specifically it can be argued that during crisis situations interaction patterns are more likely to conform to the structural balance principle than during non-crises situations. What is more, this seems true whether a single nation perspective is chosen or whether a systemic perspective is chosen.<sup>18</sup>

The reasons for arriving at this conclusion are not complicated. On the basis of the "time" variable, the "saliency" variable, and the "subsystem" variable which were discussed above, and on the basis of an additional, "quantity of interaction," variable, it can be argued that

crisis situations provide an initial best bet for the successful operationalization of the structural balance concept. These variables, no doubt, are interrelated in a fashion that gives crises their peculiar quality, but for the purpose of discussion they can be treated briefly one at a time.

Taking the time variable first, it would seem that during a crisis international relations processes are speeded up. A situation that may take years to evolve during non-crisis situations when international interaction levels are low and considerable time passes between events may take days or even hours to develop in a crisis situation when interaction levels are high so that crises seem to provide opportunities to study international relations in foreshortened time periods.

Relations between countries are multidimensional. That is, interaction about several issues may occur among countries during any given time period so that interaction, say, among Arab countries may reflect the issues of the Arab-Israeli dispute, an Islamic Pact, or an Arab Cold War.<sup>19</sup> This seems more true in non-crisis periods as compared to crisis periods. In crisis periods, it seems that the international relations of those nations that are involved in the crisis are dominated by the central issue of the crisis so that the crisis issue becomes the most salient issue among the countries involved. Thus, it would seem that observing international structures during crises would most likely reveal the structures that are associated with single issues, and relieve the analyst from trying to decide if this or that event-interaction is associated with this or that issue.

In trying to determine which nations are mutually responsive to which

issues, crisis situations again seem to provide the best opportunity for operationalizing the structural balance notion. It will be recalled that relations among the nations in international subsystems seem most likely to be balanced and that subsystem boundaries seem determined by density of interaction over specific issues. When a certain issue dominates the relations among nations, and when daily interaction levels are intensified it would seem that international subsystems are more easily identified than at other times.

Finally, whether a function of crises themselves, or whether a function of crises reporting mechanisms, for example newspapers and chronologies, it seems that event-interactions are more thoroughly reported during crisis periods than during non-crisis periods. This results in richer data sources for crisis as opposed to non-crisis periods, and is another reason why it may be argued that the structural balance notion holds the greatest promise for successful operationalization during crises.

The objective of this paper has been to present some generalized, interrelated notions about how international relations structures might be expected to conform to the structural balance principle. This objective has been fulfilled. A system--albeit a loose system--of assumptions and implied, operational hypotheses has been presented. In addition to the generalized notions contained in this paper there were some specific references made regarding crisis situations and the opportunities for confirming specific hypotheses derived from the general discussion. Elsewhere, some specific hypotheses have been developed along with the algorithms that are required to test those hypotheses for confirmation against systematically derived data about international relations.<sup>20</sup>

## FOOTNOTES

<sup>1</sup>Quoted in Frank Harary, "A Structural Analysis of the Situation in the Middle East," Journal of Conflict Resolution, 5, 2 (June, 1961), p. 169. Also, see Heider's original exposition "Fritz Heider, "Attitudes and Cognitive Organization," Journal of Psychology, 21, 1 (January, 1946), pp. 107-112; or The Psychology of Interpersonal Relations (New York: John Wiley and Sons, Inc., 1958). Presumably the term "tension" refers to the tendency of "desire" of a group or one of its members to achieve balanced relations.

<sup>2</sup>Julian O. Morrisette, "An Experimental Study of the Theory of Structural Balance," Human Relations, 11, 3 (August, 1958), p. 258.

<sup>3</sup>J. David Singer makes a similar point. See: "The Level-of-Analysis Problem in International Relations," The International System: Theoretical Essays, ed. Klaus Knorr and Sidney Verba (Princeton, N.J.: Princeton University Press, 1961), pp. 77-92.

<sup>4</sup>The convention of using digraphs consisting of points and directed lines to depict relations among nations is adopted from sociometry where the information found in digraphs has been rendered for use by matrix algebra. The need for this convention will be more apparent in the next paper when structural balance concepts are rendered amenable to matrix algebra operations.

The formal adaptation of balance theory to the theory of directed graphs is contained in Dorwin Cartwright and Frank Harary, "Structural Balance: A Generalization of Heider's Theory," Psychological Review, 63, 5 (September, 1956), pp. 277-293; Frank Harary, "On the Measurement of Structural Balance," Behavioral Science, 4, 4 (October, 1958), pp. 316-323; and Frank Harary, Robert Z. Norman, and Dorwin Cartwright, Structural Models: An Introduction to the Theory of Directed Graphs (New York: John Wiley and Sons, Inc., 1965), Especially note Chapter 13, pp. 339-362.

<sup>5</sup>For and early, systematic treatment of forces at work in triadic structures, see Theodore Caplow, "A Theory of Coalitions in the Triad," American Sociological Review, 21, 4 (August, 1956), pp. 481-493; and "Further Development of a Theory of Coalitions in the Triad," American Journal of Sociology, 64, 5 (March, 1969), pp. 488-493.

<sup>6</sup>Besides the Caplow work cited above, two other authors are of theoretical relevance here: William A. Gamson, "A Theory of Coalition Formation," American Sociological Review, 16, 5 (August, 1961), pp. 373-382; and William H. Riker, The Theory of Political Coalitions (New Haven, Connecticut: Yale University Press, 1962).

<sup>7</sup>The source of this concept is Harary, op. cit., 1959; and Harary, Norman and Cartwright, op. cit.

<sup>8</sup>James N. Rosenau, "Pre-theories and Theories of Foreign Policy," Approaches to Comparative and International Politics, ed. R. Barry Farrell (Evanston, Illinois: Northwestern University Press, 1966), pp. 27-92; and "Foreign Policy as an Issue Area," Domestic Sources of Foreign Policy, ed. James N. Rosenau (New York: The Free Press, 1967), pp. 11-50. See also: Patrick Doreian, "Interaction Under Conditions of Crisis," Papers XI, 1969, Peach Research Society (International), pp. 89-107

<sup>9</sup>Heider, op.cit., 1946. Interestingly, the "Stanford Group" (Robert C. North, et al.) hinted at the tension concept: "With a rise in the level of tension, adjustment activities will increase to the point at which tension begins to be reduced. Thereafter the adjustment activities will taper off as tension is lowered and will tend to cease when the cost of activity begins to contribute noticeably to the level of tension. This is apt to be a level of just enough--but not too much--tension which will produce optimum functioning." Robert C. North, Ole R. Holsti, H. George Zaninowich, and Dina A. Zinnes, Content Analysis: A Handbook with Applications for the Study of International Crisis (Evanston, Illinois: Northwestern University Press, 1963), p. 147.

<sup>10</sup>There seems to be some relationship between the concepts being presented here and those developed by W. Ross Ashby. If individual triadic situations were viewed as the system operating a field, then Ashby's concepts of stable, unstable, and ultrastable systems might be adopted here. However triadic structures are being viewed as part of larger systems, and the following quotation from Ashby seems to apply, "An important feature of a system's stability (or instability) is that it is a property of the whole system and can be assigned to no part of it. The stability belongs only to the combination; it cannot be related to the parts considered separately." The real distinction is probably one of perspective: the possibility of a grand East-West-Third World triad deserves some thought. See: W. Ross Ashby, Design for a Brain: The Origin of Adaptive Behavior (New York: John Wiley and Sons, Inc., 1960), p.56.

<sup>11</sup>Charles A. McClelland, Theory and the International System (New York: The Macmillan Company, 1966), Chapter 4.

<sup>12</sup>This concept owes its origin to Karl W. Deutsch, Nationalism and Social Communication: An Inquiry Into the Foundations of Nationality (Cambridge, Massachusetts, The M.I.T. Press, 1966).

<sup>13</sup>Saliency here has to do with the importance of a particular triad for maintaining a larger system's structure. This is different from the usual notions of saliency which refer to decision makers' perceptions primarily.

Compare this criterion for grouping countries according to interaction linkages with other criteria such as "attribute variables."

<sup>14</sup>James N. Rosenau, op. cit., 1966

<sup>15</sup>Does this describe what happened to Cuba in the late 1950's and early 1960's?

<sup>16</sup>Harary, Norman and Cartwright, op. cit.

<sup>17</sup>The question of whether "internal" or "external" variables account for the larger amount of variation in international relations still provides a topic for debate. An early, but still relevant, essay dealing with this question is Fred A. Condermann's "The Linkage Between Foreign Policy and International Politics," International Politics and Foreign Policy: A Reader in Research and Theory, ed. James N. Rosenau (New York: The Free Press, 1961), pp. 8-17.

<sup>18</sup>For an argument that crises themselves are a subject of special interest to international relations scholars see: Charles A. McClelland, "The Acute International Crisis," The International System: Theoretical Essays, ed. Klaus Knorr and Sidney Verba (Princeton, N.J.: Princeton University Press, 1961), pp. 182-204.

<sup>19</sup>The term "Arab Cold War" is used in the same sense that Malcolm Kerr used it in referring to competition among the left-leaning Arab states for leadership of the "progressive forces" in the Arab Middle East. See: The Arab Cold War, 1958-1964; A Study of Ideology in Politics (London: Oxford University Press, 1965).

<sup>20</sup>See: Charles A. McClelland, et al., The Management and Analysis of International Event Data: A Computerized System for Monitoring and Projecting Event Flows (Los Angeles, California: University of Southern California, 1971); Ronald G. Sherwin, "Introduction to the Graph Theory and Structural Balance Approaches to International Relations" (Los Angeles, California: WEIS Project, University of Southern California, November, 1971); and Ronald G. Sherwin, "Structural Balance and the International System: An Empirical Operationalization" (Los Angeles, California: WEIS Project, University of Southern California, forthcoming).

THE NOTION OF STRUCTURAL  
BALANCE AND THE INTERNATIONAL  
SYSTEM  
Ronald G. Sherwin